

REMARKS

In the Office Action, the Examiner rejected claims 1-44 and 46-67. Applicant canceled claim 45 in a previous communication. By the present Response, Applicant amends claims 1, 2, 11, 15, 24-26, 29, 41, 50, 55, 58, 61, and 63-67 to further clarify the claimed subject matter. Upon entry of the amendments, claims 1-44 and 46-67 will remain pending in the present patent application. Applicant respectfully requests reconsideration of the above-referenced application in view of the following remarks.

Objection to the Specification

Applicant acknowledges the Examiner's citation of 37 C.F.R. § 1.56 with respect to applications 10/201,007 and 10/201,073, which were co-pending applications as of the date of the most recent Office Action. However, as the Examiner may appreciate, 37 C.F.R. § 1.56 clearly recites:

The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent *was cited by the Office* or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98.

37 C.F.R. § 1.56 (emphasis added).

Applicant further notes that, in the present case, the Examiner has already cited the above-referenced co-pending applications. Thus, according to the clear meaning of the regulation, any duty Applicant may have had under 37 C.F.R. § 1.56 with respect to these co-pending applications has been fulfilled by the Examiner's citation of these applications. Consequently, 37 C.F.R. § 1.56 clearly cannot support the Examiner's request for correction. Accordingly, Applicant respectfully requests withdrawal of the present objection. However, if the Examiner should believe that correction is still appropriate, Applicant respectfully requests that the Examiner provide a tenable statutory or regulatory basis for requiring correction.

Double Patenting Rejections

In the Office Action, the Examiner rejected claims 1-44 and 46-67 under the judicially created doctrine of obviousness-type double patenting in view of claims 1-35 of U.S. Patent No. 6,862,538, and provisionally rejected the same claims in view of claims 1-37 of U.S. Patent Application No. 10/201,007. Although Applicant does not necessarily agree with the Examiner's assertion, Applicant is amenable to filing a terminal disclaimer upon allowance of the claims in the present application. Any such filing will, of course, be informed by any restrictions or election requirements made by the Examiner during the course of prosecution. Accordingly, Applicant respectfully requests that the Examiner hold in abeyance the double-patenting rejection until the present claims are determined to be allowable.

Rejections Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1-5, 8-12, 15-31, and 58-67 under 35 U.S.C. § 102(e) as anticipated by Mir et al. (U.S. Patent No. 6,549,871). The Examiner also rejected claims 1, 2, 4-17, 19-31, 39-44, 46, and 48-64 under 35 U.S.C. § 102(b) as anticipated by Kliman et al. (U.S. Patent No. 6,042,265). Further, the Examiner rejected claims 32-37, 39, and 40 as anticipated by Dowling et al. (U.S. Patent No. 6,144,924). Applicant respectfully traverses these rejections.

As a preliminary matter, Applicant notes the Examiner has imported the Kliman et al. and Dowling et al. references from the prosecution history of a co-pending application, yet provided only a cursory rationale as to why the Examiner believed these references anticipate the present claims. Particularly, contrary to the Examiner's general assertion, the present claims recite features not present in the co-pending application, which the Examiner failed to address with any specificity in the instant Office Action. Applicant again respectfully reminds the Examiner of his duties and obligations under 37 C.F.R. § 1.104 and MPEP § 707.07 and request that the Examiner provide a legally sufficient basis for the present rejections, if maintained, and specifically cite the presently recited features in a

future non-final Office Action to enable Applicant a fair and reasonable opportunity to respond to the present rejections.

Legal Precedent

Anticipation under Section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under Section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). Moreover, the prior art reference also must show the identical invention “in as complete detail as contained in the ... claim” to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). Accordingly, Applicant needs only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter.

Rejection of Claims 1-5, 8-12, 15-31, and 58-67 based on the Mir et al. Reference

Turning now to the present claims and first addressing the anticipation rejection based on the Mir et al. reference, the Mir et al. reference fails to disclose each element independent claims 1, 15, 25, 58, and 61, as amended. As an initial matter, Applicant greatly appreciates the explanation provided by the Examiner for this rejection in the Response to Amendment portion of the recent Office Action. See Office Action mailed July 8, 2005, pages 9-11. Particularly, the Examiner suggested that these independent claims be rewritten to focus on “determining the electrical parameters of the motor.” See *id.* at page 11. From the Examiner’s remarks, it appears that the Applicant and the Examiner disagree on the proper scope of the claims in general, and the recited term “establish” in particular. Applicant believes the scope afforded the term “establish” by the Examiner is beyond the broadest reasonable interpretation that would be afforded by one skilled in the art, particularly in view of the specification. See, e.g., Application, page 32, line 27 – page 33, line 7. However, in the interest of efficient prosecution,

Applicant has amended independent claims 1, 15, 25, 58, and 61 to further clarify the claimed subject matter and maintains that the Mir et al. reference clearly fails to disclose the recited features of these claims. In accordance with the Examiner's comments, Applicant believes the present amendments clearly distinguish the instant claims from the Mir et al. reference. However, Applicant invites the Examiner to contact the undersigned attorney if he believes further clarification is desirable.

The Mir et al. reference is generally directed to a method for estimating current in a permanent magnet (PM) electric machine. Col. 2, lines 49-50. Particularly, Mir et al. teach the acquisition of data pertaining to the torque produced by the electric machine, the rotational position and velocity of the electric machine, and the temperature of the electric machine. Col. 2, lines 50-57; *see also* col. 3, lines 21-65 (providing various sensors for data acquisition). Once acquired, one or more of these data points are used to calculate an estimate of the current in the electric machine. Col. 2, lines 51-61; col. 3, line 66 – col. 4, line 7. Applicant respectfully notes that torque, temperature, position, and velocity cannot be reasonably considered to be electrical data. With this in mind, the Mir et al. reference merely discloses *using non-electrical data to estimate current* (a single electrical parameter) in an electric machine. *See* col. 8, lines 15-55; Abstract.

The Mir et al. reference fails to disclose each element of independent claims 1, 25, and 58, as amended. For instance, independent claim 1 recites an electronic device operable to “*calculate* estimated values of a *plurality* of electrical parameters of an electric motor *based on electrical input data*” (emphasis added). Claim 25 similarly recites an electronic device operable to *calculate* estimated values of a *plurality* of electrical parameters of a motor based on *electrical input data*. Likewise, independent claim 58 recites operating an instrumentation system to “*calculate* estimated values of a *plurality* of electrical parameters of the motor based on ... *electrical input data*” (emphasis added). Because the Mir et al. reference fails to disclose such elements, the cited reference fails to anticipate independent claims 1, 25, and 58.

As noted above, Mir et al. disclose a technique for estimating a *single* electrical parameter (current) based on *non-electrical data* such as temperature or torque. The Mir et al. reference simply fails to disclose estimating a *plurality* of electrical parameters, as recited by the present claims. The Mir et al. reference is further deficient in that it fails to disclose using electrical input data to calculate such parameters, as also recited by the instant claims. As a result, the Mir et al. reference cannot anticipate independent claims 1, 25, and 58.

Additionally, independent claim 1 recites that the electrical input data is obtained at a single load point of the motor, while claim 58 recites electrical input data obtained with three load points on the motor. Applicant respectfully notes that the Mir et al. reference is *completely silent* on whether parameters are obtained at a single load point or at multiple load points. It would thus be incongruous to suggest that the reference discloses calculating estimated values of a plurality of electrical parameters based on electrical input data obtained from either a single load point or multiple load points, as alternatively recited by claims 1 and 58.

Further, the Mir et al. reference also fails to disclose each element of independent claims 15 and 61, as amended. For instance, independent claim 15 recites an electronic device operable to “calculate an estimated value of an *operating parameter* of an electric motor *based on electrical input data*” (emphasis added). Similarly, independent claim 61 recites operating an instrumentation system “to calculate an estimated *operational parameter* of the inverter-driven motor *based on ... the electrical input data*” (emphasis added). Because the Mir et al. reference fails to disclose each and every element of these claims, the cited reference fails to anticipate independent claims 15 and 61.

Among its teachings, the Mir et al. reference does disclose the use of motor temperature and torque, which may be properly categorized as operational parameters, to determine the current in an electric machine. However, it should again be noted that the

Mir et al. reference, at best, is directed to estimating a single *electrical* parameter (current) *based on non-electrical data* that may include the temperature of, and torque produced by, an electric machine. Conversely, the present claims are clearly directed to calculating an estimated *operational parameter* of a motor instead of an electrical parameter. Further, the present claims recite calculating the operational parameter based on *electrical* input data. As would be appreciated by one skilled in the art, the parameters of torque, position, speed, and temperature may not be properly classified as “electrical input data.” In other words, the Mir et al. reference teaches the *opposite* of the instant claims. Consequently, the Mir et al. reference cannot be fairly considered as teaching every element of the present claims.

Still further, independent claim 15 also recites that the electrical input data is obtained at three load points of the electric motor. Applicant again submits that the Mir et al. reference is *completely* silent on whether parameters are obtained at a single load point or at multiple load points. As such, the cited reference cannot be reasonably considered to disclose “electrical input data obtained at first, second, and third load points of the electric motor” as recited by independent claim 15.

Because the reference fails to teach such recitations, the Mir et al. reference fails to anticipate independent claims 1, 15, 25, 58, and 61. Consequently, the Mir et al. reference cannot support the Examiner’s rejection with respect to these claims. Further, the claims depending from these independent claims are believed equally allowable not only for their depending from an allowable base claim, but also by virtue of the subject matter recited by each dependent claim. For instance, dependent claims 2, 26, and 60 generally recite calculating, or the capability to calculate, an estimated value of an operating parameter based on the estimated electrical parameters. For reasons similar to those provided above, Applicant respectfully submits that the Mir et al. reference fails to disclose such subject matter. Due to the numerous deficiencies of the cited reference,

Applicant respectfully requests withdrawal of the rejection based on the Mir et al. reference and allowance of claims 1-5, 8-12, 15-31, and 58-67.

Rejection of Claims 1, 2, 4-17, 19-31, 39-46, and 48-64 based on the Kliman et al. Reference

Similarly, the Kliman et al. reference fails to disclose each element of independent claims 1, 15, 25, 41, 50, 55, 58, and 61. For instance, independent claim 1, as amended, recites an electronic device operable to calculate estimated values of a plurality of electrical motor parameters “*during operation of the motor without disconnecting the motor from a load*” (emphasis added). Independent claims 15, 25, 41, 50, 55, 58, and 61, each variously recite a similar element, in which values are obtained during operation of the motor without the need for disconnecting the motor from a load or removing the motor from service. Thus, contrary to the methods taught by Kliman et al., the presently disclosed techniques are well suited for testing in a number of environments, including in the field in which the motor operates. Because the Kliman et al. reference fails to disclose such an element, the cited reference fails to anticipate independent claims 1, 15, 25, 41, 50, 55, 58, and 61.

The Kliman et al. reference is generally directed toward estimation of rotor temperatures in induction motors. Col. 1, lines 5-8. The reference discloses several methods for rotor temperature estimation, including the use of an equivalent circuit method described in IEEE Standard 112-1991, Method F. *See, e.g.*, col. 3, lines 20-37. A copy of IEEE Standard 112-1991, Method F, is enclosed herewith for the Examiner’s convenience as Exhibit 1. Upon thorough consideration of Method F, however, it is evident that this method requires considerable interruption of the normal operation of a motor, including a no-load test and impedance testing, which includes locked-rotor tests and reduced load testing. *See* IEEE Standard 112-1991, pages 23-24. Further, as would be appreciated by one skilled in the art, Method F is generally used in a laboratory setting and ill-suited for testing a motor that is in operation.

Applicant has also enclosed with this communication a Department of Energy report from 1998 on various methods of measuring the efficiency of motors that have already been installed. *See* Exhibit 2. Notably, the report discusses IEEE Standard 112-1996, Methods F and F1, disclosing that these two methods require additional invasive tests, such as removed-rotor and no-load tests, and are thus unsuitable for routine field use. *See* Exhibit 1, pages 2-3. While Applicant concedes that certain *portions* of Method F include testing at a reduced load, such as section 6.7.1.2.2, Method F also requires no-load testing, such as section 6.7.1.1. Because Method F requires such no-load testing, in addition to other invasive tests, it cannot be reasonably argued that Method F can be utilized “during operation of the motor *without disconnecting the motor* from a load” (emphasis added) as generally recited in the present claims. Consequently, the inclusion of Method F in the cited reference in no way renders the Kliman et al. reference anticipatory with respect to independent claims 1, 15, 25, 41, 50, 55, 58, 61, or their respective dependent claims.

Rejection of Claims 32-37, 39, and 40 based on the Dowling et al. Reference

Further, the Dowling et al. reference also fails to disclose each element of independent claim 32. For instance, independent claim 32 recites “means for obtaining electrical parameters of an electric motor based on electrical input data of the electric motor” and “means for estimating at least one operating parameter of the electrical motor based at least partially on the means for obtaining electrical parameters.” Because the Dowling et al. reference fails to disclose each and every element, the cited reference fails to anticipate independent claim 32.

As may be appreciated, the Dowling et al. reference is generally directed to a method for evaluating and reporting the condition and performance of a motor during operation. Col. 1, lines 5-9. Particularly, Dowling et al. provide for the measurement of shaft speed, output, and efficiency, in addition to detecting stator winding shorts and broken rotor bars. Col. 2, lines 32-39. Further, Dowling et al. teach using current and

voltage measurements with previously known parameters to directly determine speed and efficiency. After careful analysis of the passages cited by the Examiner, Applicant respectfully submits that the cited passages do not disclose obtaining electrical parameters of an electric motor based on electrical input data of the electric motor, or means for estimating at least one operating parameter of the electrical motor *based at least partially on the means for obtaining electrical parameters*. Further, besides a general allegation, the Examiner has not particularly pointed to any passage or structure that he views as equivalent to the present recitations. Applicant, therefore, respectfully requests withdrawal of the present rejection and allowance of claims 32-37, 39, and 40. In the alternative, Applicant again respectfully requests that the Examiner provide a specific rejection that outlines a tenable rationale for the rejection.

For these reasons, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. § 102 and allowance of claims 1-37, 39-44, 46, and 48-67.

Rejections Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 6, 7, and 55-57 under 35 U.S.C. § 103(a) as unpatentable over Mir et al. in view of Giuseppe (U.S. Patent No. 6,281,659); claims 13 and 14 as unpatentable over Mir et al. in view of Discenzo (U.S. Patent No. 6,295,510); and claims 3, 18, 38, 47, and 64 as unpatentable over Kliman et al. in view of El-Sharkawi. Applicant respectfully traverses these rejections.

Legal Precedent

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner

must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Omitted Features of Independent Claim 55

Applicant respectfully notes that the Mir et al. and Giuseppe references fail to disclose each element of independent claim 55, as amended. For instance, independent claim 55 recites operating an instrumentation system “to *calculate* estimated values of a *plurality* of electrical parameters of the motor *based on ... the electrical input data*” (emphasis added). As discussed above, the Mir et al. reference discloses neither calculating estimated values of a plurality of electrical parameters nor calculating such values based on electrical input data. Further, the Giuseppe reference fails to obviate the deficiencies of the Mir et al. reference. Because the cited references, whether taken alone or in combination, fail to disclose each and every element of the instant claim, the Mir et al. and Giuseppe references cannot support a *prima facie* case of obviousness with respect to independent claim 55 or dependent claims 56 and 57.

Dependent Claims 6, 7, 13, and 14

Applicant notes that each of claims 6, 7, 13, and 14 depends from independent claim 1. As discussed above, the Mir et al. reference fails to disclose each element of independent claim 1. Further, the Giuseppe and Discenzo references do nothing to obviate the deficiencies of the Mir et al. reference. As a result, dependent claims 6, 7, 13, and 14 are allowable on the basis of their dependency from an allowable independent

claim, as well as for the subject matter separately recited in these dependent claims. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejection and allowance of claims 6, 7, 13, and 14.

Dependent Claims 3, 18, 38, 47, and 64

Applicant notes that claims 3, 18, 47, and 64 depend from independent claims 1, 15, 41, and 61, respectively. As discussed above, the Kliman et al. reference fails to disclose each element of independent claims 1, 15, 41, and 61. Further, the El-Sharkawi reference does not obviate the deficiencies of the Kliman et al. reference. As a result, dependent claims 3, 18, 47, and 64 are allowable on the basis of their dependency from a respective allowable independent claim, as well as for the subject matter separately recited in these dependent claims. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejection and allowance of claims 3, 18, 47, and 64.

Further, in the Office Action, the Examiner rejected claim 38 under § 103(a) as unpatentable over Kliman et al. in view of El-Sharkawi. However, Applicant respectfully notes that claim 38 depends from independent claim 32, which was rejected on the basis of the Dowling et al. reference. Applicant respectfully notes that neither the Kliman et al. nor Dowling et al. references disclose each element recited by independent claim 32. Further, the El-Sharkawi reference does not obviate the deficiencies of these references. Consequently, dependent claim 32 is allowable on the basis of its dependency from a respective allowable independent claim, as well as for the subject matter separately recited in this dependent claim. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejection and allowance of claim 38. However, should the Examiner believe that rejection is proper, Applicant respectfully requests correction and clarification of the rejection in a non-final Office Action to ensure Applicant is given a reasonable opportunity to respond.

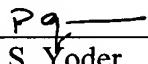
For these reasons, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. § 103 and allowance of claims 3, 6, 7, 13, 14, 18, 38, 47, 55-57, and 64.

Conclusion

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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